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ABSTRACT

This RAMP (Records and Archives Management Programme) study is intended for people involved in planning and conducting archival and records management training; for individual archivists and records managers interested in professional development through continuing education programs; and for all information professionals interested in learning of the extent to which education in automation has been and is being promoted as an essential part of the training of archivists and records managers. The basic objective of this study is to formulate guidelines for an automated data processing (ADP) curriculum for archivists. A brief summary of the development of ADP instruction for archivists, documentalists, and to a lesser extent, historians, has been included. Information about the demands for and the supply of instructional media is included. The curriculum was prepared to meet the needs of archivists in developing countries. Questionnaires and correspondence reveal that only a small portion of the profession has adequate ADP instruments to meet current needs. Technology is mentioned only to the degree that it is included in the guidelines. Following the introduction, the document includes the following sections: Development of Instruction for Information Scientists; Status of Instruction for Archivists; Rationale and Guidelines for an Archival Curriculum; Syllabi; and Conclusion. (THC)

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A Model curriculum for the education and training of archivists in automation: a RAMP study

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A MODEL CURRICULUM FOR THE EDUCATION AND TRAINING OF ARCHIVISTS IN AUTOMATION: A RAMP STUDY

prepared by
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PREFACE

The Division of the General Information Programme of Unesco, in order to better meet the needs of Member States, particularly developing countries, in the specialized areas of records management and archives administration, has developed a long-term Records and Archives Management Programme - RAMP.

The basic elements of the RAMP programme reflect the overall themes of the General Information Programme. RAMP thus includes projects, studies and other activities intended to:

1. Promote the formulation of information policies and plans (national, regional and international).

2. Promote and disseminate methods, norms and standards for information handling.

3. Contribute to the development of information infrastructures.

4. Contribute to the development of specialized information systems in the fields of education, culture and communication, and the natural and social sciences.

5. Promote the training and education of specialists in and users of information.

The present study, prepared under contract with the International Council on Archives - ICA - is intended for those involved in planning and conducting archival and records management training; for individual archivists and records managers interested in professional development through continuing education programmes; and to all information professionals interested in learning of the extent to which education in automation has been and is being promoted as an essential part of the training of archivists and records managers.

Comments and suggestions regarding the study are welcome and should be addressed to the Division of the General Information Programme, Unesco, 7 place de Fontenoy, 75700 Paris.

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1. INTRODUCTION

1.1 Origin of Study

1.1.1 The members of the Ad Hoc Working Party on the Implications of Automatic Data Processing for Archival Management (now the Committee on Automation of the International Council on Archives) who met for the first time in Spoleto Italy, 23-25 May, 1972, were either self educated about the archival utility of automatic data processing (ADP) or received formal instruction at their own initiative (see 2.4.4 to .8). It was understandable, therefore, that they resolved to promote the development of instructional media for the archival profession.

1.1.2 The group decided to establish a network of correspondents for the exchange of information about ADP, to publish a bulletin and guidelines about archival automation, to prepare a syllabus for an ADP course, and to conduct a pilot seminar on automation. As part of the preparation for the pilot seminar, an outline for an orientation course for all archivists was submitted to the ICA. The content of the seminar is described below (2.4.7).

1.1.3 The group further decided that preparing a model curriculum should await additional seminars, exchanges of information about educational opportunities, and the publication of texts on archival applications. Finally, at the committee meeting, in 1981 and 1982, it was agreed that the time was appropriate for preparing the curriculum. Funding was proposed by UNESCO as part of the Records Management and Archives Programme (RAMP). The contract for this study was negotiated between UNESCO, ICA and the committee.

1.2 Importance of a Curriculum

1.2.1 Instruction in automation has lagged considerably behind the need to deal with the pressure of technological change in archives. Researchers (governmental, scholarly, genealogical, and other) are increasing their demands for archival services, while in most archival establishments the staff to provide services efficiently using conventional methods is inadequate. Automated techniques are being recognized as an eventual, long-term, cost effective method for handling these demands. ADP hardware and software facilitate the production of budgets, financial and statistical tabulations, indexes, and many other routine documents, and the staff is thus freed to engage in other functions.

1.2.2 Delmas noted that archivists will find it desirable or necessary to use new technologies to deal with the "explosion" of documents.[1] Similarly, Taylor recommended automation to deal with the content of records, in addition to the traditional concerns about their organization.[2]

1.2.3 Appropriately, a textbook on information management refers to automated records control as "a computer-integrated or computer-assisted system that substantially reduces the labor of records control and increases access to and, consequently, the value of the information stored in the system." Furthermore, the authors call attention to the high rate of turnover for clerical personnel. The solution, they assert, is to train personnel for automated applications.[3] A 1970 survey discovered that libraries with computer applications provided significantly more positive responses to bibliographic requests than those that used manual methods.[4] While savings in ADP archival operations are more intangible than in libraries, both benefit by higher positive responses.

1.2.4 As will be shown, by the end of the 1960s, documentalists and librarians had made substantial progress in automating their procedures. On the other hand, all but a few archivists delayed adopting the techniques until the 1970s. M. Roper suggested that archivists and records managers had been slower in using the new technologies because of "an innate conservatism and the unlikelihood of obtaining financial benefits on the scale proven for librarians."[5]

1.2.5 In planning for operations at its new building at Kew (U.K.), the Public Record Office noted that its workload increased approximately 400% between 1977 and 1980 and that it was likely to continue to grow. Other archival institutions have experienced similar increases in their workloads, resulting in proposals for automated applications; nevertheless, few of them have developed adequate instruction for their professional and paraprofessional archivists.

1.2.6 Another incentive for education and training in automation concerns the basic archival responsibility for determining the disposition of the machine-readable records. This significant product of the information revolution, largely neglected by documentalists and librarians, should be dealt with in a curriculum for archivists. Furthermore, with a few exceptions, documentalists and librarians have not considered problems concerning the long-term values of these records and their conservation (4.2.5 to .7 and 4.6.9).

1.2.7 A survey by the Society of American Archivists in December 1979 disclosed that 55% of the archivists who responded considered technological change a major challenge and 61% were troubled by declining financial resources.[6] In writing of the challenge to librarians, which may also be applied to archivists, one specialist in archival automation wrote:

> "On the one hand, scarcity in resources will impose upon them the need to economize, standardize procedures, reduce staffing levels, and make more efficient use of existing facilities, monies and personnel. At the same time, however, libraries will be called on to provide a wider range to user service, as well as enhanced administrative and intellectual control over the information housed in their collections, ... The librarian has turned to computers to assist him in dealing with at least some of these challenges."[7]

1.3 Scope

1.3.1 Instruction, which includes both education and training, in archival automation has lagged considerably behind the requirements for dealing with the rapidly changing technology. Education refers mainly to formal courses, typically at the college or university level, that provide generalized knowledge about ADP history, theory, concepts, and practices. Training provides instruction about ADP applications, with clearly determined goals for participants. Most training is provided by short-term seminars, workshops, and on-the-job instruction. Some seminars, by covering briefly theory, terminology and practical applications, are educational. In contrast, most archival seminars deal specifically with a single topic, like current technology, administration, acquisitions, the production of finding aids, and the storage of machine-readable records.

1.3.2 "Workshop" is a useful term common in the United States. It designates training for persons who lack knowledge about the specific application that is the subject of the instruction. In that context, a seminar refers to meetings of professionals who have some knowledge about a specific topic and desire to increase their knowledge by listening to specialists. A conference on a topic is usually limited to one or two days. The participants may be experts about specific applications and wish to discuss concepts and problems. Conferences are informative rather than educational.

1.3.3 The basic objective of this study is to formulate guidelines for an ADP curriculum for archivists. To the study has been added a brief summary of the development of ADP instruction for archivists, documentalists, and to a lesser extent, for historians. Information about demands for and the supply of instructional media is included.

1.3.4 The curriculum has been prepared especially to meet the needs of archivists in developing countries; however, in dealing with the impact of recent technological changes, only a few archival programmes may be regarded as fully "developed." Questionnaires and correspondence reveal that only a small proportion of the profession has had adequate ADP instruction to meet current needs.

1.3.5 While the study and model curriculum deal with the broad area of automatic data processing (ADP), they relate mainly to electronic data processing (EDP). Technology is mentioned only to the degree that it is included in the guidelines. The use of EDP terminology could not be avoided. Readers unfamiliar with the term should refer to glossaries. A multi-language ADP glossary (Elementary Terms in Archival Automation) has been published by the ICA Committee on Automation and is available from the editor of ADPA.

1.4 Acknowledgments

1.4.1 The author required many sources for data to prepare this study. Several questionnaires and individual letters were sent to selected archivists and others involved in ADP instruction. The members of the Committee on Automation contributed oral and written replies to numerous inquiries and gave their encouraging support. A correspondent member of the Committee circulated a questionnaire to numerous university and local archivists within Great Britain. The members of the Task Force on Automated Records and Techniques, Society of American Archivists, also provided encouragement and advice.

1.4.2 Correspondence and meetings were also held with officials of the Education and Training Section, International Federation of Documentalists (FID), and with representatives of the International Federation of Library Associations and Institutions (IFLA).

1.4.3 John Kimball, Director of Research Reference at the U.S. Library of Congress, who has promoted education in EDP at the institution, compiled a brief bibliography and assisted in obtaining services from the Research Facilities Section of the Library. Only a small proportion of the books and periodicals examined at the library have been cited.

2. DEVELOPMENT OF INSTRUCTION FOR INFORMATION SCIENTISTS

2.1 Emergence of Information Science to 1962

2.1.1 Automation and related instruction in archival administration owed much to the applications in information science as it emerged from library and documentation fields. It is useful, therefore, to note briefly some features of that development.

2.1.2 Automated techniques were first used in the physical sciences. The related education was devoted to mathematics, computer theory and engineering, the FORTRAN programming language, and to specific applications. As one would expect, the earliest documentalists and librarians to use EDP were those who specialized in storage and retrieval of books and other documentation relating to science and technology.

2.1.3 The designation "information scientist" was mainly an outgrowth of the computer revolution. This title was first popularized in North America and Great Britain. Until recently, most countries retained the designation "documentalist."

2.1.4 By definition, information scientists are experts in the creation, evaluation, use, retrieval, dissemination and storage of informational sources. Archivists, documentalists, librarians, and records managers, beyond their own fields, are also experts in most or all of these activities. . In fact, since the 1960s, documentalists and librarians who broadened their knowledge about handling and retrieving information became known as information specialists. Later, certain managers of current records in governmental and private organizations also were identified as information specialists.

2.1.5 Most archivists and museum curators have not considered themselves information specialists though they are expert in the management of information. It is not surprising, therefore, that their specialized educational needs were ignored in information science curricula. Advances in computerization have been the main cause for the increasing recognition that the several professions have common interests.

2.1.6 The concept of documentation (the collection, organization, retrieval and dissemination of information about specific subjects) emerged in the 1930s. The documentalist profession gained international recognition by the organization in 1938 of the International Federation of Documentalists (FID) as the successor of the International Bibliographic Institute. Members of the Association of Special Libraries (ASLIB) noted that documentalists differed from

general librarians by requiring "specialized knowledge at graduate level of the subject in which they organize their services." ASLIB did favor interdisciplinary discussions on education and called attention to advances in joint education at the University of London School of Librarianship and Archives (emphasis added).[8]

2.1.7 Despite the divergence of the two professions, educational programmes overlapped to a considerable extent. Learning indexing and bibliographic techniques were essential to documentalists and librarians. Documentalists required, in addition, detailed training in abstracting. Also, they specialized in at least one area of research. It should be noted that special librarians also require education in the subject matter of their specialization.

2.1.8 The availability of the second generation of computers at the end of the 1950s led to an increasing community of interests of the two professions. In 1959 Hans Peter Luhn developed for IBM the key-work-in-context (KWIC) system for computers. Documentalists soon recognized its utility. Computer specialists, hardware and software companies, and some educators realized that software media programme computers could be developed for librarians. In 1962 IBM, for one, compiled manuals for computer operations that were adaptable to both professions (3.3.7).

2.1.9 Thus, by 1962 a relatively small percentage of librarians, especially those with a knowledge of documentation techniques, began to investigate and promote the use of computers for bibliographic controls. In contrast, archivists -- with their historical orientation and concern about provenance, and the uniqueness of their holdings -- saw little utility of the media for their operations.

2.2 Progress of ADP Instruction Since 1962

2.2.1 The adoption of automated techniques in libraries and documentation centers was greatly influenced by the development of the MARC format (machine-readable cataloging) at the Library of Congress and MEDLARS (retrieval system for medical literature) at the U.S. Library of Medicine. Dissemination of information about the systems influenced library and information science schools to reexamine their curricula to meet demands for ADP instruction. Nevertheless, appropriate educational adjustments lagged. Libraries relied on computer experts, provided usually by vendors, to install and operate systems.

2.2.2 In the first issue of the Journal of Library Automation a Harvard University librarian asserted that "assembling, training, and holding a competent staff was the most important single element in a library's automation

effort. The number of trained and experienced library systems people," he continued, "was still extremely small in relation to the ever-growing need and demand."[9]

2.2.3 Several universities during this period expanded their recently developed courses on computer science to include instruction on information storage and retrieval systems that could be applied in a variety of environments. The pioneer curriculum developed by the University of Newcastle-upon-Tyne, apparently became a standard for instruction in information handling. Beginning in the 1960s, its curriculum for the bachelor of science degree in information science provided for one year of courses that concerned an introduction to information science theory, techniques and practices; the use of mathematics in sciences; and the historical development of science and technology. Supplementary courses comprised most of the second year, with the addition of instruction on bibliographic procedures for literature on science and technology. The third year was devoted to practical experience in libraries and documentation centers. Much of the fourth year was devoted to data processing, information storage and retrieval, and computer applications in general.[10]

2.2.4 Several universities in the United States had similar curricula at the graduate level. Most, or more, of the courses were given by French documentation institutes, the German Gmelin Institute of Technology, Poland's Central Institute of Scientific and Technical Documentation, the All-Union Institute for Scientific, Economic and Technical Information of the Union of Soviet Socialist Republics (USSR), and institutes in other countries. University College London deserves particular mention because its curriculum in the information sciences has included courses for archivists.

2.2.5 At present, most students learn about automated techniques for studies in the physical and social sciences and in the humanities (history and linguistics). Junior archivists and librarians as a consequence may be better adapted to technological changes than their superiors who lacked similar opportunities.

2.3 Instruction for Museum Curators and Records Managers

2.3.1 Repositories of current, intermediate and archival records with many employees and voluminous holdings acquire computers for administrative, statistical, clerical and fiscal operations. In addition, certain of their operating procedures are sufficiently similar to permit interchanging automated systems. Archivists and records managers have had joint responsibility for scheduling and retiring records; thus, they may exchange data generated by conventional or

automated systems.[11] Furthermore, they are responsible for acquiring, arranging, maintaining, storing, and providing access to records, all of which may be controlled by computers.

2.3.2 Museum curators document the provenance, location, research use, and the loan of their objects. Controlling this documentation and providing access to the objects overlap the activities of archivists and records managers. The three professions have conventional or automated systems for assigning projects and auditing their progress. To perform these activities efficiently, many museum curators are adopting computer applications.

2.3.3 These similarities suggest that representatives of the three professions may attend together certain courses, seminars, workshops, and conferences. Although it should prove mutually beneficial, joint attendance is still rare.

2.3.4 Records managers, like archivists, were slow to recognize the need to learn about the utility of automated techniques to perform their duties. Also, like archivists, a relatively small number of the managers acquired a knowledge about the impact of computers by readings and by discussions with computer specialists.

2.3.5 Apparently, the earliest records managers to become involved in automation were those in scientific and technical agencies and insurance companies. These organizations had been generating and analyzing data in machine-readable form. The records managers eventually realized that they should advise the computer specialists and the tape librarians about the orderly retirement of the media. After they learned about the utility of computers for inventory controls, a few conceived the idea of using a data base for scheduling the retirement of records and for planning their storage in intermediate repositories (records centres). Later, they adapted the technology for computer assisted retrieval of microfilmed records (4.4.2).

2.3.6 During this same period, the early to mid-1960s, archivists also recognized the challenge posed by the exponentially increasing numbers of tapes and other media with potentially valuable data. They, too, investigated the possibility of computer-assigned controls for the transfer of records from intermediate repositories to archives. Nevertheless, the two professions made little effort to coordinate their ADP instruction. To earn an Information Resources Management Certificate in the U. S. records managers are required to take courses on information technology, word processing, and office automation.

2.3.7 Museum curators appear to have become involved in automation in the latter half of the 1960s. The British Museum Association established the Information Retrieval Group in 1967, mainly to investigate automation for indexing and cataloging museum documentation. The group became the Museum Documentation Association in 1977. Its publications about classification and automation became teaching media.

2.3.8 In the United States, the Smithsonian Institution developed a system (SELGEM) that has been useful for controlling retrieval of objects; documents on their acquisition, display, loans, and conservation (records management); and the production of guides and indexes for the archives and manuscript collections in the custody of the Smithsonian Archives. A leading journal for museums, Curator: Quarterly Publication of the American Museum of Natural History, includes occasional articles on ADP applications.

2.3.9 Delmas, in his excellent study on archival education, wrote, "The preservation of the national heritage involves both objects and written materials, and the harmonization of the professions concerned with information should be able to be extended to in the training of museum curators." Such harmonization, however, is yet to be realized.[12]

2.4 Role of UNESCO and Allied Agencies

2.4.1 Whatever progress has been achieved toward the harmonization of ADP education and training in the information sciences may be credited largely to the seminars, conferences, publications, and consultations organized or funded by UNESCO. These contributions to the dissemination of information about computer applications were developed during the 1960s under UNISIST (international exchange of information about scientific and technological sources and their control) and the programmes of the Division of Documentation, Libraries and Archives (DBA). In 1976 the newly established Division of the General Information Programme (PGI) succeeded DBA and broadened UNISIST to comprise the development of methods, norms, standards, principles and techniques for the processing and transfer of information. Training information personnel, including archivists, and developing projects for encouraging the adoption of automated applications have a high priority within PGI.

2.4.3 Archival automation had received scant attention from UNESCO until 1971. Most programmes dealing with automation had been coordinated through FID and IFLA. Their interest in ADP had been concerned mainly with documentation that related to science and technology. Furthermore, relatively few archivists had been planning and implementing computer applications. 15

2.4.4 The report by Robert-Henri Bautier for the 1971 International Archival Round Table noted progress in archival automation since the 1965 meeting of the Round Table. At the earlier meeting all but one of the participants had expressed the view that automation was irrelevant to archives.[13] Bautier's report and a resolution by the Round Table influenced the International Council on Archives (ICA) to arrange a meeting in 1972, with financial assistance from UNESCO, of archivists who had interests in applying automated techniques.

2.4.5 These archivists reached a consensus that a major need for the participants and archivists generally was to become educated in automated techniques and in methods of managing machine-readable records. With UNESCO funding the group conducted an international seminar in Sussex, England, in 1974.

2.4.6 Twenty-five countries were represented at the one-week seminar. The main topics concerned managing archival and administrative records with computer assistance, operating automated systems, processing data, retrieving information, indexing, constructing thesauri, applying computers for library operations, and operating a machine-readable archives. During the discussion of library applications, several participants suggested that archivists, documentalists, and librarians should coordinate their educational programs.[14]

2.4.7 Methods of improving education and training remained on the agenda of every subsequent meeting of the ICA Committee. In 1977 ICA contracted with UNESCO for a seminar in the Ivory Coast for African archivists. Though several topics were omitted, the content was similar to the one in Sussex, England. A third seminar of three days was conducted at University College London before the ICA Congress of 1980.[15]

2.4.8 The establishment, with UNESCO assistance, of the archival training centres in Accra and Dakar provided a major contribution to ADP education and training because the directors included in the curricula lectures about and demonstrations of automated techniques. In addition, UNESCO and ICA contracted for a model curriculum for records management and archival administration.[16]

2.4.9 Among the contributions of UNESCO toward joint efforts by archivists, documentalists and librarians probably the most important has been its programme for joint meetings by ICA, FID, and IFLA. The meeting in 1980 at Bellagio was especially useful for its concentration on the topic of automation.

3. STATUS OF INSTRUCTION FOR ARCHIVISTS

3.1 Survey of Archival Establishments

3.1.1 Though education and training in archival automation continues to lag behind current requirements, many archival institutions have made progress in filling the gap. Most of them concentrate their EDP training on applications that are being planned or actually installed. The Swedish national archives, for example, instructs its staff about the retirement of machine-readable records because that programme is considered more important than developing automated finding aids. Most others have largely limited instruction to automated indexing and/or text retrieval.

3.1.2 Long-established archival organizations have had to change and adapt their practices and even their mandates to accommodate the technological advances. On the other hand, they have the advantage of a relatively large number of employees to justify access to computers. Recently developed archives could -- and several have -- adapted readily to automation.

3.1.3 Advances in ADP instruction may be illustrated by outlining briefly developments in selected countries. In Europe, distinguished archival schools in the Federal Republic of Germany, France, the German Democratic Republic, Italy, the Netherlands, and Spain have added ADP components to their extensive curricula. The Archives School at Marburg provides a practicum on the HETRINA software system at the Hessian State Archives. The new textbook for archival studies in the German Democratic Republic includes explanations of data processing.[17] The French national archives has incorporated ADP instruction in its three-month "Stage" and publishes a newsletter concerning ADP applications.[18]

3.1.4 About half of the professional staff at the Austrian State Archives has had at least an orientation in EDP. Several members received instruction at The Institute for Austrian Historical Research. Most of the others who received instruction took EDP training courses at the Federal Academy of Administration.

3.1.5 All personnel of the Romanian State Archives and the Singapore Archives has received EDP instruction. In the Union of Soviet Socialist Republics, the Universities of Moscow and Kiev include ADP instruction as part of their archival courses. All professionals and paraprofessionals in the Main Archives Administration have received on-the-job instruction concerning automatic cataloguing, indexing and listing locations. The Moscow State Historical Archive Institute is planning to educate archivists about the management of machine-readable records.

3.1.6 Most of the keyboard operators who provide input to the automated systems at the national archives of the Ivory Coast are graduates of secondary schools. In Israel, archivists receive education on automation at the Archives and Library Science School of Hebrew University.

3.1.7 Archivists in Great Britain rely on several universities for their professional education. As the Public Record Office in London has several automated systems, most of its staff has had computer instruction. Some of the staff in provincial and private archives have taken workshops conducted by vendors.

3.1.8 The federal systems in Australia, Canada and the United States have contributed to decentralized systems of archival education. The public Archives of Canada offers seminars on records management, with an ADP component. Other seminars for federal employees are conducted by the Public Service Commission. The Society of Canadian Archives has devoted sessions to automation. The Master of Archival Studies Programme of the School of Librarianship, University of British Columbia, requires a 13 week course on "automation and archives." About half of the time is devoted to a general introduction to computers and the remainder to archival applications and machine-readable archives. The basic courses on archives at the University of Quebec in Montreal have considerable EDP content.

3.1.9 In the United States, the Society of American Archivists has taken a leading role in ADP instruction by means of short-term workshops that teach the administration of machine-readable archives or ADP applications for archival management and operations (3.3.4 to .5). In the 1970s the National Archives and Records Service, probably the first to install ADP applications, gave a short course on computers. Since then staff members have relied individually on outside workshops and courses. Several universities have integrated automation in archival and library curricula.

3.1.10 As the Australian Archives received its legislative authority recently (Act No. 79 of 1983), its organization, administration and operations are being accommodated to contemporary concepts and technology. Its staff is receiving intensive ADP instruction.

3.2 Education in Colleges and Universities

3.2.1 Students at colleges and universities may choose among a variety of ADP courses. Depending on their objectives, the students may learn about computer concepts and theory, programming languages, computer engineering, bibliographic controls, quantification in social sciences and the humanities, and the like. Though archivists may benefit from one or more of such courses,

only a small percentage of schools of higher learning offer ADP courses specifically designed for their profession.

3.2.2 Library/information science schools do offer several ADP courses that are useful for archivists. The courses provide education in systems analysis, basic computer technology and concepts, data storage and retrieval, user studies, automated office procedures and the methodology of networking, indexing, and abstracting. Usually, instruction concerning machine-readable archives, provenance, analyses and descriptions of record series, and text retrieval is omitted.

3.2.3 These deficiencies are overcome in the relatively few library schools that also offer degrees in archival science. These few schools permit substitutions of history and/or social sciences for advanced courses in library science. Unfortunately, specialized courses in archival automation, with analyses of illustrative applications, remain rare.

3.2.4 Archival students in history departments of universities may take electives in the use of computers in research. The courses include lectures about and practical experience with statistical packages and word processing equipment. The students are likely to learn about the changing directions of historical studies resulting from computer assisted research. These developments have had an impact on archival usage. The students may or may not be instructed on bibliographic formats that could have archival utility. They may discover, however, that the professors of history are not computer-oriented. Those who have a background in quantification are especially qualified. Social historians who use genealogical, census, and survey data are frequent clients of archives.

3.3 Other Instructional Facilities

3.3.1 Archivists who have had traditional archival education and who wish to learn ADP techniques rely on readings, seminars, workshops and conferences. Recently, universities have been conducting seminars of one to three days for basic instruction and for up-dating knowledge about recent developments. Some universities have established special institutes for non-credit ADP instruction.

3.3.2 Since the 1960s the Inter-University Consortium for Political and Social Sciences at Ann Arbor, Michigan, has conducted ADP seminars originally for political scientists and later for social scientists, librarians and archivists. The several weeks of instruction and practicums deal with statistical methodology, networking, data programming and processing, analyses of data, data bank management, machine-readable records and data storage and

retrieval. Similar seminars are conducted in other nations, e.g., the Institut d'Etudes Politiques de Paris and the Social Science Computing Laboratory at the University of Sussex.

3.3.3 Various professional associations, governmental agencies, vendors of ADP hardware and software also provide useful training. Seminars and workshops offered by archival associations frequently meet the specialized needs of archivists. Associations that are planning the seminars may benefit from the experience of the Society of American Archivists (SAA).

3.3.4 In 1966 SAA devoted a major session of its annual meeting to papers relating to automation for archival and manuscript repositories. Because of the interest in the topic, most of which concerned indexing projects, the papers were published in the April 1967 issue of The American Archivist. The following year the society established committees to inform members about automated techniques and the management of machine-readable records.

3.3.5 At its meeting in 1972, the SAA Committee on Machine-Readable Archives resolved to develop a training programme as one of its objectives. The first seminar did not materialize until 1978, with a workshop on the appraisal of machine-readable records. Since then the SAA, through its Task Force on Automated Records and Techniques, has conducted workshops on automated access to archives, the use of microcomputers, and other topics. In 1984 the Task Force decided to have a continuing training programme, consisting of two workshops, each of two days. The workshop on automated techniques includes training on word processing, financial systems, and data base management. The workshop on machine-readable records comprises an introduction to automated record systems and instruction on creating files, managing current machine-readable records, scheduling their retirement, documenting systems, conducting and analyzing surveys of data files, linking records, describing data files, and disseminating and preserving the records. The Task Force is planning workshops and seminars on machine-readable records at the introductory, intermediate, and advanced levels. To provide readings the SAA publishes bibliographies and manuals.[19]

3.3.6 Governmental agencies responsible for training civil servants offer ADP seminars and workshops. On the basis of the training available at the French Bureau of Development, Department of General Administration, and the U.S. Office of Personnel Management, we may assume that similar agencies offer introductory courses and short-term seminars on such topics as programming languages, library automation, data base management, ADP for general administration, computer security, and systems analysis. These seminars provide adequate introductory instruction for archivists and records managers though they are unlikely to include any reference to archival applications.

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3.3.7 Many vendors of computer hardware, software, and systems analyses provide training services. All must include instructional documentation to purchasers and contractors. IBM, for example, published in 1964 a manual on automation for librarians. Since then it has offered short-term -- sometimes comprising only a few hours -- instruction at its offices or at the location of the purchases. Siemens provides similar training.

3.3.8 Software vendors and consultants conduct workshops on the fundamentals and applications of data processing. One firm, AIRS, Inc. of Baltimore, Maryland, has developed a software package specifically for on-line archival information retrieval (ARCHON III) that includes a sub-system for self-instruction, even for those who lack any prior computer knowledge.[20] Instruction by vendors is designed to promote the sale of their products. On-the-job training is limited to the specific applications of each archival institution.

3.3.9 When an archival agency adopts a computer system, it should provide the staff with instruction on its utility. This training may be conducted by computer specialists or, better, by a qualified member of the staff. For those with no knowledge of computer techniques, the presentation may be prefaced usefully with a rudimentary explanation of computer operations and terminology. The members of the staff who are directly involved in developing or operating ADP applications should be encouraged to attend conferences of their peers.

4. RATIONALE AND GUIDELINES FOR AN ARCHIVAL CURRICULUM

4.1 General Content

4.1.1 Schools for archival education should include theoretical and practical instruction about automation in their curricula. All but a few of the components listed in Cook's 1982 guidelines for curriculum development in records management and archives could include references to automation.[21] Ideally, the lectures and practicums for each of these components should explain both manual and automated methods; however, the lecturers on the topics may not yet be familiar with ADP techniques.

4.1.2 Whether or not professional and paraprofessional archivists have had ADP education, directors of archival repositories should develop a programme of ADP instruction. Even small institutions for which automation may be premature are well-advised to have at least one computer-literate staff member. Processes may then be planned so that they can be readily adapted to a change from manual to automated systems. In addition, the guidelines that follow are appropriate for curators of manuscript collections.

4.1.3 A list of readings for EDP instructors and students is not included in this study. Publications about EDP are expanding rapidly and bibliographies tend to become obsolete within a few years. The publications cited below are currently the most useful sources. These include an EDP bibliography by Kesner, comprising 943 entries; guides and a glossary prepared and distributed by the ICA Committee on Automation; several conference proceedings; publications by National Archives and archival associations with training programs; and books by Kesner and Cook.[22]

4.1.5 The explanation for a syllabus for basic instruction that follows is organized in accordance with the components in Cook's guidelines for education of records managers and archivists. This arrangement permits educators to plan the integration of computer instruction in their regular curriculum. The syllabus is designed for schools of archives and for archivists who plan attendance at a series of seminars and workshops. Parts 4.5 and 4.6 concern the syllabus for executives and ADP specialists.

4.1.6 An introduction to information science has become of great significance to archivists. Lectures about the techniques employed by documentalists, librarians and publishers should refer to EDP applications, such as abstracting, indexing, bibliographic controls, word processing and electronic photocomposition. It is appropriate to preface this "foundation course" with at least three hours devoted to ADP history, utility technology, and terminology. The history is designed to show that electronic computers are the culmination

of the invention of devices for counting, beginning from ancient times, through the abacus, the Babbage machine, and the Hollerith electrical equipment. A recently published elementary text on computers, with a comprehensible glossary and bibliography, should be assigned for the technology and terminology component. For many participants, lectures on technology may in part be redundant while computer jargon changes at least as frequently as technological change.

4.1.7 The presentation on computer history should deal with the role of computer technology for research in the physical sciences (including space explorations) though the topic concerns archivists mainly to the degree that it may create machine-readable data of lasting value. An examination of the role of computers in the social sciences and history is of considerable archival interest because of their impact on research among primary sources in archives.

4.1.8 Sections 4.2 to .4 explain the recommended curriculum for records managers and professional and paraprofessional archivists. Section 4.5 deals with the additional training for the executives of archival establishments and Section 4.6 recommends the advanced instruction for those archivists who choose to initiate and implement ADP systems. Sections 4.7 to .9 comprise outlines of the three syllabi.

4.2 Management and Retirement of Current Records

4.2.1 As Cook notes in his study, lectures on records management should include references to automation. Computer assistance has been a substantial aid to controlling and accessing records from their creation to their destruction or transfer to an archives. Designing a records management programme without considering automated as well as manual systems invites eventual obsolescence.

4.2.2 The technology can produce and control forms, compile and distribute reports, monitor the flow of correspondence, organize classification schemes, manage filing space and equipment, retrieve microfilm images, and provide statistical analyses of operations. Thus, efficient records management has become so computer-oriented that lecturers on the topic should be well-informed about the varied applications.

4.2.3 The element of records management that is most generally automated concerns records disposal (retirement). It is indeed rare for any organization that generates a large volume of records to lack a records retirement schedule. Computer printouts can alert records managers and archivists to the expiration of the time when records must remain in current administrative use. Also, the printouts note whether the records are to be destroyed, sent to an intermediate records repository (usually a records centre), or transferred to the archives.

Restrictions on access to the retired records may be shown by a fixed field in the computer record. A sub-system can document where records are located in the intermediate repository.

4.2.4 Training for records managers and their archival associates in computerized scheduling and retirement requires about two days. Professional and paraprofessional archivists who are not involved directly in appraising and accessioning records may not require more than an initial orientation of about one hour. Instructors may demonstrate computer assisted records disposal by showing the printouts of any of a number of existing applications.

4.2.5 Until the last decade, most records managers and archivists had not concerned themselves sufficiently with the special problems relating to the management and retirement of machine-readable records (magnetic tape and other data storage media). Generally, these records had been controlled by computer specialists and stored by tape librarians. Unless they consulted records managers, the machine-readable records had not been scheduled and retired in accordance with standard procedures. Often, the ADP staff had erased the media without regard to any potential long-term research value. In many institutions the media continue to be unscheduled.

4.2.6 Until the mid 1970s, archivists had even less concern about the machine-readable records than had the records manager. With few exceptions, the records managers and archivists had not considered data in machine-readable form records though they had been produced by an organization in performance of its objectives. The archival practice of delaying acquisition of records until they had been thirty years old or more was another reason archivists had neglected involvement in the retirement of the media. Unfortunately, many archivists do not yet question decisions about the retention or erasure of data in machine-readable form.[23]

4.2.7 It should be evident, then, that records managers and archivists should receive instruction about the creation, storage, and retirement of machine-readable records. The depth of this instruction depends on the extent to which administrative agencies are automated.

4.3 Basic Archival Functions

4.3.1 Printouts from an automated retirement system provide archivists with essential data for accessioning records. An archives which schedules a number of accessions at about the same time may use automation to log offers of records, their appraisal and transfer, and the space available for their storage. A quite brief example of this application may follow the instruction about automated retirement systems. Optionally, instructors may refer to the

possibility of adding a field for showing whether the records require restorative procedures. A similar system can be introduced to list any records requiring restoration. Also, optionally, instructors may discuss the potential value of computer assistance for arranging masses of disorganized records and manuscripts.

4.3.2 Instruction on automated description, on the other hand, has become a necessity for all professional archivists and is highly desirable for paraprofessionals. A full day in archival schools or at seminars devoted to the production and dissemination of finding aids is advised. At least two extra days will prove essential for advanced instruction. Several national archives have developed systems for indexing and describing maps, charts, art works, motion and still pictures, and sound recordings. These and other archives use automated techniques for production of guides, indexes, inventories, and locator lists for textual records. The topics for training include the use of natural language, thesauri and authority lists; the indexing of personal and place names, dates and subjects; text retrieval; narrative descriptions; recording provenance; and locator lists. These applications should be illustrated by reference to domestic and foreign systems (see 4.4.3).

4.3.3 The above applications are best treated by dealing with specific operations of an archival repository and should demonstrate the utility of automated techniques for efficiently conducting the processing functions. Students should be encouraged to suggest tasks within an institution that could be assisted by automation. Furthermore, the attendees should be impressed with the need for precise use of terms and when, after the training, he or she is assigned a task, with the need to consider potential computer-assistance.

4.3.4 Linguistics, diplomatics, and sigillography have had no generally known archivally automated applications. To be sure, computers are used for analyses of documents and ancient languages. They are used also to study and construct designs, an application that may be applied to sigillography. When such applications have undergone sufficient development, they are best included in the explanation of computer capabilities as part of the foundation course concerning information science.

4.4 Instruction in Common with Other Professions

4.4.1 In his guidelines, Cook, in addition to the foundation course, deals separately with archival operations which are similar to operations in the information and managerial sciences (pp. 44-46 and 54-56). As indicated in Part 2, above, archivists should attend courses, seminars, and conferences with other professionals who deal with common operations.

4.4.2 Even now, some archival courses on reprographics neglect computer output and input microfilm (COM and CIM) and computer assisted microfilm retrieval. These applications have become so prevalent in organizations that produce large quantities of records (like financial and statistical offices) that records managers are expected to be knowledgeable about the techniques. As records in these media may have archival value, archivists should also be informed about the technologies. Furthermore, the archival establishment itself may wish to apply computer assisted microfilm retrieval. This application may be especially useful for the exchange of microfilm among archival repositories, for example, in resolving problems about "removed archives."

4.4.3 Cook asserts convincingly that archivists should be trained in the theory and practice of indexing, bibliographic control, networking and other techniques employed by documentalists and librarians. He notes, for example, the usefulness of such applications for the development of national information systems. Several of these applications are recommended for the production and dissemination of finding aids. Attendance at seminars devoted to the interchange of technologies among the professions is desirable for archivists and records managers.

4.4.4 Documentalists and librarians are automating user studies. Few archivists, on the other hand, prepare detailed studies of users of their holdings and their access to specific records though such studies have utility. (The archival directorate of Spain computerizes lists of dissertations that require archival access.) Furthermore, user studies may assist archivists for appraising or reappraising archives. The use of computers for control of reference (access) activities, like that in the Public Record Office of Great Britain, can generate details about the use of archival holdings.

4.4.5 A few of the topics to which Cook refers under the heading "management science" have been computerized. Statistical data have been compiled automatically since the introduction of the first generation computers. By the period of the second generation, automation has facilitated fiscal and personnel operations. Instruction in these applications is most appropriate for executives (see part 5) though at least a brief lecture on the topic is recommended for all professional and paraprofessional archivists.

4.4.6 Lecturers will presumably show slides that diagram and illustrate computer operations. A visit to a computer installation should be part of the concluding session at archival schools. Archivists who have completed professional education without automation components and who have been trained through seminars, on-the-job instruction, and readings are advised to witness an archival ADP application and actually use a terminal. Using a terminal with self-instructing software or with a user-friendly language like BASIC may

overcome any residual fears of computers. Studies have shown that such fears remain when computers are introduced into an organization.

4.4.7 Professional archivists require at least three hours of basic instruction in computer technology while instruction for paraprofessionals may be limited to one to two hours. Those who desire advanced ADP instruction should have the equivalent of a university semester about computer components, systems, and processing techniques.

4.4.8 Elementary training in computer concepts -- for example, Boolean logic, binary mathematics, memory, and storage terminology, analog and digital systems, hardware components, computer languages, flow charts, the difference between general and special purpose software, and in the characteristics of major recording media (tape, cards, disks, chips and others) -- would encourage some of the archivists to learn more about computers. All should acquire sufficient knowledge to participate in plans for and implementation of computer applications. Increasingly, of course, persons entering the profession will have previously gained proficiency in computer use.

4.4.9 The entire staff, including clerks, should be aware of the utility of EDP operations concerned with personnel and file management, reference controls, and the generation of statistics, inventories, reports and correspondence. Demonstrations of EDP inputs and outputs of these applications add interest to the on-the-job instruction. Familiarity with word-processing is especially important. Appropriate use can significantly reduce costs of producing reports, finding aids, and correspondence. Discussions about these topics will serve to remove much of the mystery about computerized payrolling and other important activities.

4.5 Instruction for Executives

4.5.1 Experience has been the method by which many executives have learned how to administer organization, personnel management, budget, and policy formulation. Increasingly, contemporary executives of large institutions attend seminars and read extensively on managerial techniques. Planning and managing computer programs cannot be learned adequately by experience alone. On the one hand, the orientation course noted above is too superficial for executives; on the other hand, the education required of computer specialists (see below) is too detailed, unless the executive is the main operator of the EDP systems.

4.5.2 Executive training in automation requires about 40 hours, preferably in a specialized educational environment away from the archives. Spare time would then be devoted to required EDP readings. Attendance at seminars with other executives, especially librarians and documentalists, has obvious merits.

Administrators should have acquired a basic knowledge about archival ADP applications before attending the executive seminar. They may then relate the discussions to their special needs.[24]

4.5.3 Usually, elementary EDP courses or seminars include lectures on computer concepts, terminology, hardware components, software programs and recording media, computer languages, office automation, and network potentials. Unless executives have acquired a knowledge of these topics, they will find it essential to learn them before deciding to institute an EDP application. Without this knowledge, executives are likely to encounter difficulties in communicating with and understanding applications proposed by EDP specialists. Executives should learn EDP basics to assume leadership in the development of national information systems and the compilation of standards for data elements in archival data banks.

4.5.4 A basic part of executive instruction concerns methods of planning the introduction of EDP applications. The chief sub-topics are likely to include auditing current procedures, assigning a feasibility study, critically reviewing the study, and deciding on the recommendations in the study. Directors of archives decide whether implementing a suggested EDP application would result in substantial savings in the long-term or would provide substantially better archival service. They review the cost of the proposals and determine whether the resources are available. This responsibility applies to both individual retrieval tasks and to the establishment of a machine-readable archives unit.

4.5.5 The next logical element of this training concerns the implementation of approved applications. The sub-topics should include sessions on organizational problems, personnel allocations, decisions about hardware, vendor relations, and, for machine-readable archives, privacy and security problems.

4.5.6 Unless the executive is both planner and implementer, he or she will assign the implementation to one or more members of the staff or to a contractor. Nevertheless, the executive will wish to review continually the performance of the application with regard to achieving the objectives and determine whether it is cost-effective. A review of the organizational and manpower implications of automated techniques and the acquisition of machine-readable records is inevitable. Learning how others have handled these matters should ease the tasks.

4.5.7 Dealing effectively with vendors of hardware and software requires determining in advance what is expected from the vendors, examining their capabilities, drafting the terms of contracts, and negotiating the final terms,

including costs. Purchasers of systems have been obstructed because some vendors of software systems were unable to provide the desired product.

4.5.8 A post-audit of any installation of an EDP application is essential and may be neglected under the pressure of other managerial duties. Executives would benefit by learning from the experience of other managers about the timing and methodology of reviewing the performance of systems and of the personnel assigned to them.

4.5.9 For a final product the executive may be asked to or actually volunteer for the preparation of a simulated EDP programme. This project would assure the executive that he or she has mastered an understanding of EDP. A critical review by the instructor would round out the executive's EDP education.

4.6 Advanced Training

4.6.1 Each executive will eventually decide about the selection of one or more staff members for advanced ADP instruction. (A number of archivists with whom the author corresponded registered for advanced education at their own initiative to the great benefit of their institutions. Most of them were to become middle managers or executives.) The alternative requires the recruitment of an EDP technician. The first alternative has been recommended by the Committee on Automation; however, when a computerized application is required urgently, the technician (or consultant) may be preferred. Placing this specialist under the direction of a senior member of the staff is desirable. Even when a technician is added to the staff, at least one member of the staff should be selected for comprehensive training in archival automation. Archivists with a background in the social sciences and statistics are especially prepared for advanced EDP training.

4.6.2 The archivist selected for advance training may be enrolled in a university or sent to a series of seminars. Archives, library, information or civil service schools of the types mentioned in part 3 would be the most effective instructional institution. While seminars offered by professional organizations and vendors are also helpful for training, they have the disadvantage of extending the period of instruction and the seminars may not be well integrated; however, seminars on the special archival topics noted below should supplement courses on EDP technology and practice. Specialists must be certain that the education and training is of a high caliber by examining the qualifications of instructors and the quality of hardware and software employed in the computer laboratory.

4.6.3 This advanced training should include most or all of the elements noted for executive training. Rather than oriented toward decision-making with regard to EDP applications, the specialist will require this knowledge to prepare proposals for the executive. These elements, as noted below, will be studied in greater detail. For example, the instruction concerning recording media should deal in depth with the utility of cards, tape, disks, drums, chips and other media. The specialist should learn the elements of circuitry and should be educated about a wide variety of hardware equipment. Preferably, the education in technology should be acquired in a university setting. The discipline of required courses, papers, and examinations provides assurance of high standards of performance.

4.6.4 Courses in the methodology of planning, organizing and maintaining data banks are available in any school that provides EDP education. Their chief utility in archives concerns the development of time series for statistical data about reference units and budgets and the maintenance of information about accessioning, disposal and transfers of records. The course should include methods of updating the data banks and of providing periodic and special printouts.

4.6.5 Instead of the brief session on programming languages, the specialist requires literacy in languages like BASIC, COBOL, FORTRAN and PL-1. He or she also requires a detailed knowledge of assemblers, compilers, and translators. Readings and seminars will provide information about archivally-useful software systems and formats, like the MARC Archival and Manuscript Control format (AMC) GOLEM, MISTRAL, PROSPEC, STAIRS and SPINDEX.

4.6.6 Archivists who specialize in EDP require a seminar or a series of lectures on systems analysis and the compilation of feasibility reports. To recommend an EDP system, the specialist must first analyze the existing conventional system and then show the advantages and the disadvantages of any EDP system. Implementing systems also requires an analytical study.

4.6.7 A course in statistical methods is desirable. Statistical methodology is useful for studying reference and other activities, as well as appraising and making available statistical data in machine-readable form.

4.6.8 Most specialists need readings and seminars on the organization and management of machine-readable archives.[25] The degree of training on machine-readable archives for those not directly involved in its operation is inadequate for the specialist/manager who:

1. assists in the selection of a qualified staff;
2. develops systems and forms for surveying and appraising automated records in administrative agencies;
3. assures adequate documentation for each computerized file;
4. provides standards for formatting and storing electronic media; and
5. develops procedures for access to the records (confidentiality and secrecy, copying files and providing user-documentation, and establishing methods of reformatting files to meet user needs).

4.6.9 The management of machine-readable archives may require a study of laws, regulations and court decisions about privacy and secrecy. EDP operations, in general, may require a knowledge about patent and copyright laws. In such conditions, the ADP specialists should be prepared, after consultations with lawyers, to advise archival directors on related legal problems.

4.6.10 Formal courses and training seminars and conferences are available for learning the storage and retrieval techniques suitable for archives. As noted above, library schools offer education on cataloguing, indexing, abstracting, managing data bases, networking, and constructing thesauri.[26.] These schools and history departments may include text retrieval methodology as well. Training in records management, data elements in archives, the production of archival finding aids, and networking are provided by archival societies and on-the-job instruction. Professional organizations and UNESCO have conducted quite useful national and international conferences for specialists. Regional and national networks may reduce software costs and improve service to researchers.

4.6.11 Specialists advise their organizations about methods for automating internal administrative activities. They should learn the latest techniques for project controls, word processing, telecommunications, electronic publications, work stations for staff members, and the like. One to three-day seminars are recommended. The seminars should be directed toward methods of solving problems instead of training in particular applications.

4.6.12 Lastly, the archivists who have become sufficiently educated in computer applications should be encouraged to share their knowledge through lectures in archival schools and by providing on-the-job instruction to all members of the staff.

5. SYLLABI

5.1 Preface

5.1.1 Three syllabi are outlined below. The first lists topics for all professional and paraprofessional archivists; the second, the topics for archival executives; and the third lists topics for advanced education and training for archivists who wish to become specialists or managers of ADP operations. Records managers should have instruction on the topics that comprise "Basic Instruction." Some of them may profit from education similar to that for archival specialists.

5.1.2 For some of the topics listed under "Basic Instruction" numbers are added that refer to the passages that explain their inclusion. The others are self-explanatory. An asterisk (*) suggests inclusion of clerks in the instruction on a topic.

5.1.3 The columns for "hour equivalency" indicates the duration of the instruction for the components of the syllabus. The hours are an approximation that may be devoted to the component at an archives school or university. The actual amount of time devoted to the topic by persons employed in an archives depends on the degree of involvement in ADP applications. The letter "O" in the column shows that the topic is optional and the time allotted is likely to be less than an hour.

5.1.4 The time devoted by paraprofessional archivists to most of the topics listed in the first syllabus may be reduced by about half. Those paraprofessionals who provide input to computers may require somewhat more instruction than their peers.

5.2 Basic Instruction

Topics		Hour Equivalency
A.	**History and Utility of ADP**	
1.	History of Computing (4.1.6)*	1/2
2.	Use of EDP in Physical and Social Sciences and History (4.1.7 & 3.2.4	1/2
3.	Use in Libraries and Documentation Centers (4.4.4)	1/2
4.	Use by Records Managers and Museum Curators (2.2, 2.3 & 4.2)	1
5.	Use in Administrative Agencies (2.2 & 2.3)	1
6.	Use in Archives and Manuscript Repositories (3 & 4)*	2
B.	Technical Information (4.1.6)	
1.	Concepts and Terminology (4.4.8)	1/2
2.	Hardware (Main frame, mini and microcomputers, input and output devices)*	1/2
3.	Software (data base, general and special purpose software) and Systems Analysis	1/2
4.	Languages, Boolean and Mathematical Methodology (4.4.6 to .8)	1
5.	Computer File Management (flow charts, format, file, record, field sort, merge and documentation)	1
6.	Recording Media (tape, card, disk, drum, chip, etc.)*	1/2
7.	Tape Library Management (labeling, storage, inventories)	0
8.	Computer Output and Input Microfilm (4.4.2)	1/2
C.	Administrative Management (4.4.5 & .7)*	
1.	Fiscal and Personnel Management	1/4
2.	Project Control	1/4
3.	Statistical Reports	1/2
4.	Word Processing	1/2
D.	Archival Functions - General (4.2.3 & 4.3)	
1.	Scheduling and Storing Records in Intermediate Repositories	1
2.	Controlling the Acquisition Process	1/2
3.	Controlling Storage in Archives	1/2
4.	Controlling Preservation Projects	0
5.	Standardizing Data Elements and Descriptors	0
6.	Cataloging Rules and Classification	0

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7.	Bibliographic Controls	1/2
8.	Producing Guides, Inventories and Indexes (4.3.5)	1
9.	Controlling Reference and Access	1
10.	Use of Thesauri and Authority Lists	0
11.	Text Analysis and Retrieval	0

E. Archival Functions - Machine-Readable Records (4.2.5 to .7)

1.	Survey of Records in Administrative Agencies	1/2
2.	Appraisal	2
3.	Accessioning and Conservation	1
4.	Documentation	1/2
5.	Dissemination to Researchers	1

F. Other

1.	Future Prospects for Automation	1/2
2.	Archival Networks (4.4.3)	0
3.	Legal Implications of ADP Applications (4.6.9)	0
4.	Visit to a Computer Installation (4.4.6)	3

5.3 Training for Executives

A.	**Review Applications in Information Science and Archives**	
1.	Libraries and Documentation Centers	1
2.	Records Management and Museums	1
3.	Administering Archives	2
4.	Managing Machine-Readable Records	1
5.	Producing Record Controls and Finding Aids	2
B.	**Review ADP Technology**	
1.	Basics on Computer Concepts and Terminology	1/2
2.	Hardware and Software Utility	1
3.	Programming, Assembling and Compiling Languages (Including literacy in a user-friendly language)	15
4.	Potentials of Networking and Data Banks	1
5.	Techniques of Flow Charting and Constructing Decision-Tables	1
C.	**Administrative Applications**	
1.	Budgets and Personnel Management	2
2.	Statistical Reports	1/2
3.	Word Processing (with practicum)	1
D.	**Plan Applications**	
1.	Surveying and Analyzing Operations	1
2.	Assigning Feasibility Study	1
3.	Reviewing Study in Terms of Benefits and Costs	2
E.	**Implement Applications**	
1.	Organizational and Personnel Implications	2
2.	Dealing with Vendors	1
3.	Organizing and Managing Machine-Readable Archives	2
4.	Managing Computer Facilities and Operations	2
F.	**Post-Audit of Applications** (Timing audit, reviewing efficiency and taking corrective action)	2
G.	**Simulate a Programme**	0

5.4 Advanced Training

A. Technology 40

1. Computer Logic
2. Hardware Capabilities
3. Input Devices and Techniques (including form design)
4. Software Characteristics and Systems
5. Processing (sequential and random, formatting, scanning, searching, collating and merging)
6. Output Devices and Techniques
7. Transmitting Devices (modem, telephone, telex)
8. Data Base Construction and Maintenance
9. Correcting and Updating Files
10. Tape Library Management

B. Literacy in Command, Machine, Assembling and Compiling Languages 24

C. System and Statistical Analyses 2

D. Operate Machine-Readable Archives 4

E. Operate EDP Storage and Retrieval Systems 20

1. Cataloging Rules and Classification Systems
2. Standardizing Data Elements
3. Adequacy of Documentation
4. Indexing and Abstracting Systems
5. Retrieving Texts and Text Analyses
6. Constructing Thesauri and Authority Lists
7. Planning and Operating Scheduling and Accessioning Systems
8. Networking
9. Producing Guides, Inventories and Location Registers

F. Office Automation 4

G. Legal Implications 0

6. CONCLUSION

6.1 The model syllabi are recommendations for the instruction of professional and paraprofessional archivists to enable them to deal with computer produced records and, when appropriate, to utilize the capabilities of automation for most archival activities. Adding these courses and seminars to the traditional archival education is admittedly burdensome to individual archivists and their institutions; yet, the advantages of achieving computer literacy should justify the effort. Provided archivists learn to recognize some of the pitfalls of automation -- software inadequacy, unreliable vendors, poorly conceived applications, inadequately trained staff, input errors, and mismanagement -- its adoption can achieve long-term savings and better service to researchers.

6.2 An additional "burden" related to EDP dynamics should be noted. Selectively, archivists will require updating of their knowledge about computers. This requirement will become evident when examination of literature on computers shows significant new development that may have archival implications. The seminars on recent technology need not exceed three days. Incidentally, such seminars for documentalists and librarians would also be useful for archivists.

NOTES

1. B. Delmas, "L 'Administration et ses archives," International Journal of Archives, 1, No. (1980), 13-19.

2. H. A. Taylor, "Information Retrieval and the Training of the Archivist, Canadian Archivist, 2, No. 3 (1972), 30-35.

3. R. J. Kalthoff and L. S. Lee, Productivity and Records Administration (Englewood Cliffs, N.J., 1981).

4. T. J. Galvin, The Case Method of Library Education and In-Service Training (Metuchen, N.J., 1973).

5. "New Information Technology and Archives," UNESCO Journal of Information Science, Librarianship and Archives Administration, 4 (Apr.-June 1982), 197.

6. SAA Newsletter (Mar. 1980).

7. R. J. Kesner, Microcomputer Applications in Libraries: A Management Tool for the 1980s and Beyond (Westport, Conn., 1984), vi.

8. ASLIB Proceedings, 6 No. 2 (May 1954), 17-18.

9. R. De Gennaro, "The Development and Administration of Automated Systems in Academic Libraries," Journal of Library Automation, v. 1 No. 1 (Mar. 1968). 83.

10. D. P. Hammer, ed., The Information Age: Its Development, Its Impact (Metuchen, N.J., 1976), 178-80.

11. The term records management is used variously. It refers in most European countries to the archival function of appraising and selectively accessioning records. A similar term is used by some computer specialists to refer to the organization of data in machine-readable files. For this study, the records manager is the person principally responsible for the maintenance, classification, utilization and dissemination of records in administrative agencies. In non-governmental organizations - chiefly business establishments - the records manager may also be the archivist. Records managers who use computer and micrographic technologies for facilitating intellectual control over the total records of an organization and can supply sources required for decision-making have retitled themselves information specialists. Most of them are rewarded with higher position classifications.

11a. J.C. Cardin, On the Coding of Geometrical Shapes and other Representations, with reference to Archeological Documents. International Conference on Scientific Information (Washington, 1958, pp. 75-87).

12. The Training of Archivists; Analysis of the Study Programmes of Different Countries and Thoughts on the Possibilities of Harmonization (UNESCO: PGI/E T HARM/6, 15 Oct. 1979),19.

13. Actes des Huitieme et Neuvieme Conference Internationale de la Table Ronde des Archives (Paris, 1965), 164-89; "Les Archives et L'Informatique," XIIIe Conference Internationale de la Table Ronde des Archives (Bonn, 1971).

14. L. Bell and M. Roper, eds., Proceedings of an International Seminar on Automatic Data Processing in Archives (London, 1975), 304-24, passim.

15. For a history of the Ad Hoc Working Party on the Implications of Automatic Data Processing for Archival Management and the Committee of Automation, see M. H. Fishbein, "The ICA Committee of Automation: A Decade of Achievement," ADPA, 4 No. 3 (1984), 9-12. Invoices for ADPA may be obtained from the editor, M. Jean Pieynes, Rue des Buissons, 65, Liege, Belgium.

16. M. Cook, Guidelines for Curriculum Development in Records Management and the Administration of Modern Archives: a RAMP Study (PGI-82/WS/16) (Paris, 1982).

17. B. Brachmann, ed., Archivwesen der Deutschen Democratischen Republik: Theorie and Praxis (Berlin, 1984) 250-51, passim.

18. Service de l'Informatique: Note d'Information. Other national sources for information about ADP are provided by the protocols of the FRG committee on EDP and the bulletin, Studien und Quellen of the national archives of Switzerland.

19. A history of the society's involvement with ADP appears in T. E. Brown, "The Society of American Archivists Confronts the Computer," American Archivist, 47 No. 4 (Fall 1984), 366-82. Up-to-date information may be obtained from SAA or from the author of this study who has assembled data about non-archival professional societies that offer ADP seminars and workshops.

20. W. T. Durr, "From Mainframe to Micro: Automation and Applications at an Archives over Ten Years." ADPA, 4, No. 3 (1984), 49-58.

21. M. Cook, Guidelines for Curriculum Development in Records Management and the Administration of Modern Archives: A RAMP Study, 51-69.

22. R. M. Kesner, Information Management, Machine-Readable Records, and Administration: An Annotated Bibliography (Chicago, 1983); R. M. Kesner, Automation for Archivists and Records Managers: Planning and Implementation Strategies (Chicago, 1984); M. Cook, Archives and Computer (London 1980); and conference proceedings, as follows: C. L. Geda et al, eds. Archivists and Machine-Readable Records (Chicago, 1980; L. J. McCrank, ed., Automating the Archives: Issues and Problems in Computer Applications (White Plains, N.Y., 1981).

23. For a study of the retirement of these records, see M. H. Fishbein, Guidelines for Administering Machine-Readable Archives (Washington, D.C. 1981), 1-8.

24. The Committee on Automation publication, An Introduction to Archival Automation, by A. Arad and M. E. Olsen (Washington, D.C. Jan. 1981) is useful for executives.

25. Those who are responsible for the management of machine-readable archives require intensive training that is not usually provided by ADP courses. Only very significant and unique data files receive the cautionary attention devoted to these archival media. A visit to an archival organization that has a fully developed machine-readable archival unit is quite desirable. Manuals prepared by the national archives of Canada, Sweden and the United States and the Genealogical Society of Utah may be used for instruction. Two manuals on the special problems of storage that are highly regarded are: L. R. Cahoon, Magnetic Media Archival Recommendations (Salt Lake City. Genealogical Society of Utah, 20 Aug. 1984); Dataakiveringskommitten, Moderna Archivmedier: Bestandighet Forvaring Tillhandahallande (Stockholm, 1976).

26. Though the utility of thesauri for archival operations remains debatable, their construction deserves inclusion in the curriculum. Several archival and manuscript repositories have compiled thesauri for parts of even all of their holdings.